was a well-defined path thru the woods; none but the tall, strong trees were standing, and these had their branches very nearly all stript off. When the spout was relieved of the weight of its base it swung out in a long, flattened curve, very much like a long rope hanging from a ship's rigging when one end is free and the wind is blowing.

We were surprised to see such an unusual demonstration at that time, because we were at anchor in calm water; for the storm had lost its energy fully a half hour before the appearance of the two spouts. It was sultry and hot where we were, and the sun was not shining directly on us, yet the clouds seemed so thin that the heat came thru very readily and diffused itself in the still air. The trees on the surrounding shores showed no evidence of wind, nor did the surface of the water. It was a dead calm, except for a little swell. I recall no thunder and lightning during the morning storm nor at the time of the waterspouts. That evening, shortly after sunset, we had a terrific thunderstorm, and during all the encampment we had severe thunderstorms and floods of rain. As we were living in tents, life was far from pleasant. * * * I have left out uncertainties, and the only part that might be doubtful is whether the larger spout was on the west side of the island or whether the spouts occurred in reverse directions from what I have stated. The sun was not shining nor do I know the direction of the tide, hence the points mentioned above might be questioned, but not their actual occurrence.

WEATHER BUREAU MEN AS EDUCATORS.

Dr. O. L. Fassig, on January 10, 1907, delivered the first of a series of ten lectures on "Weather and climatology" at Johns Hopkins University, Baltimore, Md.

Under date of January 30, 1907, Mr. M. L. Fuller, Observer, Canton, N. Y., reports that the teaching of meteorology in the St. Lawrence University at Canton has been properly recognized by his formal election as "Professor of Meteorology and Climatology", with voice and vote in the faculty. His course of instruction for junior and senior students involves two or three one-hour lectures per week, and by unanimous request of the students enrolled therein the work will be extended thru the remainder of the college year. A course embracing only one semester in climatology has also been outlined for other students who can not take the full course.

Arrangements have been made for a course of eighteen lectures on meteorology and climatology before the Clarkson School of Technology, at Potsdam. The students will be examined in these lectures and receive credit for one hour's work per week. A popular lecture committee representing the University, the School of Technology, and the State Normal School desires also a series of popular lectures. An average of about twelve hours a day has been given to meteorological work since July 1 by Mr. Fuller, and a considerable amount of time by his wife. He has also arranged to employ, at his own expense, an assistant to aid in the preparation of material for class work and lecture work, which expense will consume all of the special allowance made for these lectures by the above-mentioned committee. This extra work has been undertaken in the interest of the service, as the field appeared to be a most promising one.

In later reports Mr. Fuller states that the class beginning the work in general meteorology at St. Lawrence University numbers 28, and 10 of the 90 students of Clarkson School of Technology are enrolled for the course at that institution.

Owing to the absence of the head of the department of geology at the University Mr. Fuller has taken charge of the class in physiography, numbering 20 students. A large portion of the remainder of the course, relating to the atmosphere, the topography of the lands, the climatic control of land forms, etc., will be easily combined with the course in climatology.

Mr. J. Warren Smith, Section Director, on January 3, 1907, began regular lectures to the class in elementary meteorology at the Ohio State University, Columbus, Ohio; the lectures are given twice a week during the winter term.

Mr. A. H. Thiessen, Section Director, Raleigh, N. C., on January 19, 1907, began his regular course of lectures to seniors in the agriculture course at the Agricultural and Mechanical College, West Raleigh; the course will be practically the same as that given last year.

Mr. John R. Weeks, Local Forecaster, Binghamton, N. Y., under date of February 16, submits a manuscript lecture "On the weather—what it is and how it is observed and forecast". The text occupies about sixteen pages of manuscript, and is accompanied by a list of about a hundred slides, belonging to the Weather Bureau. When the lecture is transmitted for use copies of brief printed articles are also inclosed for the use of the lecturer, who is asked to read them and present a synopsis of their contents in connection with the exhibition of the slides. There are more slides in this lecture than in those usually delivered by the New York State Department of Education in order to provide additional popular interest. It is expected that the lectures and notes will be memorized, and that the lecturer will not read from the manuscript. Mr. Weeks states that this lecture has already been read and the slides exhibited by five persons to whom it has been loaned, and that about forty requests for its loan were received during February. He suggests the practicability of placing such a lecture, "localized for each State", in the hands of each section director, to be loaned to schools, free of cost, for public use.

This recommendation is quite in line with the work that has been done in the State of New York during the last twenty years by Prof. Albert S. Bickmore, "father" of the American Museum of Natural History in New York City. Thru his efforts in the line of geography and travel the Education Department of the State has organized a Division of Visual Instruction, of which Mr. De Lancey M. Ellis is now chief; and Mr. Ellis has issued a circular letter, dated Albany, February 1, 1907, in which he indorses Mr. Weeks's efforts and explains the conditions under which his lecture can be obtained:

> Mr. Weeks offers to send the manuscript and slides without cost to any school in the State, under the general rules governing the loan of slides issued by this department. These provide that slides shall not be used for other than educational purposes, nor upon any occasion at which an admission fee is charged or a collection of any kind is taken. Borrowers must also agree to bear cost of loss or breakage. Slides are sent by mail under Government frank, and provision is made for their return in the same way.

We heartily indorse the following paragraph from one of Mr. Weeks's letters:

> A high official once said to me that it is a waste of time to lecture to high school students and that lectures to older people were more important. My belief and experience is just the opposite, for at least two reasons. It is much easier to reach, interest, and convince high school students, and once interested they have time and opportunities for studying the subject that older persons do not have. Their minds are also free from the notions that older persons so easily get in regard to the weather. The high school boys and girls of to-day are the business men and women of four or five years from now; but now is the time to reach them with such instruction, not when they are absorbed with business cares and worries.

The Department of Education of the State of New York, with its headquarters at Albany, and Dr. Andrew S. Draper as Commissioner of Education, seems to have associated together under it the Regents of the University, the Director of the State Library, the Director of the State Museum, the Division of Visual Instruction, under De Lancey M. Ellis, and many other branches of activity bearing on education thruout its whole range from the kindergarten to the university. The

circulars that it has published, especially the syllabus for secondary schools in physical geography and agriculture, and the catalogs of lantern slides, arranged in sets, accompanied by printed lectures, should be known to all teachers in this country and elsewhere.

Mr. Wilford M. Wilson, Section Director, Ithaca, N. Y., reports that he will begin the regular course of instruction in meteorology at Cornell University with the opening of the second term, February 2, 1907; the course calls for three weekly periods of one hour each, and extends thru the remainder of the school year.

A typewritten syllabus of the course has been prepared, based on Davis's Elementary Meteorology. About two hundred slides have been collected for illustrative purposes, and the facilities for teaching have been considerably improved.

The following lectures and addresses by Weather Bureau men have been reported:

Mr. W. H. Alexander, January 17, 1907, an address to the physical geography class of the Burlington, Vt., High School; also January 30, 1907, at the Young Men's Christian Association Hall, Burlington, on "The Weather Bureau and its methods", with lantern slide illustrations.

Prof. F. H. Bigelow, January 22 and 23, 1907, at the University of Chicago, under the auspices of the departments of geography and economics, on "The circulation of the sun's atmosphere as the first cause of the annual changes in the weather", and "The circulation of the earth's atmosphere, and the new theory of storm energy".

Mr. F. H. Brandenburg, before the Trans-Missouri Dry Farming Congress, at Denver, Colo., on "The western limit of sufficient precipitation for successful farming without irrigation".

Mr. M. L. Fuller, during October, 1906, before the Silas Wright Grange, Canton, N. Y., on "The work of the Weather Bureau"; also January 25, 1907, before the Farmers' Institute, Canton, and January 28, before the Farmers' Institute, at Gouverneur, N. Y., on "The weather and the farmer's boy".

Mr. C. F. von Herrmann, January 14, 1907, before pupils of the Western High School, Baltimore, Md., on "Forecasting and storms", with lantern slide illustrations.

Prof. A. G. McAdie, January 30, 1907, before the physiography class of the San Diego (California) State Normal School on "A raindrop".

Mr. W. S. Palmer, of the Cheyenne, Wyo., office, January 26, 1907, before the Trans-Missouri Dry-Farming Congress, at Denver, Colo., on "The rainfall of southeastern Wyoming".

Mr. J. Warren Smith, January 11 and 14, 1907, before the students of the special short course in agriculture, at the Ohio State University, Columbus, Ohio, on "The work of the Weather Bureau", and on "Frost warnings and protection from frost, and lightning rods"; also, January 18, 1907, at the annual meeting of the State Horticultural Society, on "The protection of crops from frosts".

Mr. J. F. Voorhees, October 6, 1906, before the Knoxville Teachers' Association, on "Weather forecasting"; also, January 14 and 15, 1907, before the short course agricultural students of the University of Tennessee, Knoxville, Tenn., on "General meteorology" and on "Practical forecasting and the work of the Weather Bureau", with lantern slide illustrations.

Mr. J. R. Weeks, January 17, 1907, at the Public Library, Binghamton, N. Y., on "The work of the United States Government, especially the Weather Bureau", with lantern slide illustrations.

Classes from universities, schools, and academies have visited Weather Bureau offices, to study the instruments and equipment and receive informal instruction, as reported from the following offices:

Cairo, Ill., January 16, 1907, the class in physical geography from the Cairo High School.

Chicago, Ill., during the six months ending in January, 1907, classes from University of Chicago, Northwestern University, Chicago Normal School, Morgan Park Academy, South Division Manual Training School, Hoyne High School (two divisions), Hyde Park High School (three divisions), Bernard Moos High School, and Austin High School.

Columbus, Ohio, January 9 and 10, 1907, three classes in physical geography or meteorology.

Mobile, Ala., January 11, 1907, the class in physics from McGill Institute.

Pensacola, Fla., January 10 and 14, 1907, the class in physical geography from the local high school, in two sections.

Portland, Oreg., January 16, 17, 18, 22, and 23, 1907, classes from the local high schools.

Rochester, N. Y., January 30, 1907, the class in meteorology from the University of Rochester.

San Diego, Cal., January 23, 1907, the graduating class from the Angier Grammar School.

Savannah, Ga., January 25, 1907, the class in physical geography from Miss West's preparatory school.

Springfield, Mo., January 18, 1907, the class in physical geography from the local normal school; also, January 19, 1907, a class in physical geography from Republican, Mo.

THE CLIMATE OF YUKON TERRITORY.

By R. F. STUPART, Director of the Meteorological Service of Canada. Dated December 15, 1906.

[Reprinted from Transactions of the Canadian Institute, Vol. VIII.]

Meteorological observations were begun at Fort Constantine, Yukon Territory, in November, 1895, by Staff Sergeant Hayne of the Royal Northwest Mounted Police. In September, 1897, the instruments were removed to Dawson and observations were continued voluntarily by the police and by the Commissioner of the Yukon until 1900, when the duty of observing was taken over by the meteorological service, and an unbroken record has since been obtained at Dawson. Other records in Yukon in the possession of the meteorological office are as follows: Selkirk from November, 1898, to November, 1899; Tagish Lake from August, 1898, to August, 1900, and White Horse from November, 1904, to the present time. In addition to these Yukon stations, a station at Atlin, B. C., but 25 miles south of the boundary, was opened by the meteorological service in August, 1905, and will be of assistance in determining the climatic conditions of southern Yukon.

A study of all available data leads to the conclusion that while Dawson is farther north than White Horse, the climate of the former place is much more suitable for agricultural purposes than that of the latter, and in general that the northern and eastern portions of Yukon have a warmer summer climate than have the more southern portions. This is probably owing in part to the fact that the former are at a lower level than the latter, and in part to the fact that southern districts are much nearer the ocean from which the westerly winds blow; while in the north the westerly winds are from the broader land area of Alaska, and the country generally is protected by mountains ranging from 5000 to over 10,000 feet. The mean summer temperature at Dawson is fully 5° F. higher than at either White Horse or Atlin, B. C.; and while frosts seem to be frequent at the latter places in both June and August and occur occasionally even in July, in the former both June and July are practically free from frost and it is not until about August 20 that there is much danger; and very frequently September opens with as yet no frost. After the close of August the downward trend of the Dawson temperature curve is very rapid, and the winter months are probably between 15° and 20° colder than at White Horse. A summary of the general conditions of each month at Dawson will probably give the best idea of the climate.